

From: jschreck Mon Sep 22 12:25:33 1997  
From: jschreck (Jeannette Schreckenghaust)  
To: airey@engr.sgi.com, dignam@engr.sgi.com, migdal@engr.sgi.com,  
peeroy@engr.sgi.com, rad@engr.sgi.com  
Cc: jschreck@palladium, brigdenj@palladium, byrnee@palladium, hess@palladium  
Subject: 15-4-632.00/Airey/Visual/INVENTION DISCLOSURE FORM  
Date: Mon, 22 Sep 1997 12:25:29 -0700

EXHIBIT I

Hello John, Mark, Bob, Dave and Chris:

Thank you for submitting the following invention disclosure to Legal Services.  
Your disclosure has been assigned docket number 15-4-632.00, and John Brigden  
is the patent attorney who will review it.  
Please contact John (ext. 3-3034/brigdenj@corp) or Sharon Hess, patent  
paralegal (ext. 3-6532/hess@corp) if you have any questions.

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Silicon Graphics, Inc.  
Invention Disclosure Form  
DOCKET ID NO.: 15-4-632.00

To begin, enter your e-mail address here: airey

Then fill out items 1 through 9 below.

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Item 1. Provide a short, descriptive title AND a brief (2-4 sentences)  
abstract/description of your invention:

Floating Point Framebuffer

The Bali system has an innovative 16bit floating point format  
available for texture store and the framebuffer. It is referred  
to as the s10e5 format; sign bit, 10 bits mantissa and 5 bits  
of exponent. It is of central importance to several new graphics  
capabilities including programmable shading and handling images  
acquired from sensors with high dynamic range or created with  
photorealistic rendering techniques.

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Item 2. When was the invention conceived (if you have any written evidence of  
this date, please describe it and also include pointers to any on-line  
evidence):

About a year ago. There is a fp.html page that is part  
of the bali online documentation which describes the  
s10e5 format.

I checked in a C program which detailed conversion from IEEE  
32 bit floating point to the 16bit Bali format around the same  
time and checked in a model of the OpenGL graphics library with  
s10e5 framebuffers earlier than that. Sifting through the  
Bali mail will also reveal references to s10e5.

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Item 3. List all contributors to the conception of the invention (please list  
the primary contact first):

John Airey, Mark Pearcy, Bob Drebin, John Montrym, Dave Dignam,  
Chris Migdal, Danny Loh.

**EXHIBIT I**

Item 4. Has the invention been disclosed, or is it likely to be disclosed in the near future, to people or parties outside of SGI? For example, has the invention been described or demonstrated to a vendor, customer, or beta site; at a technical conference or trade show; or in a printed publication? If so, give the date and a description of each such disclosure, up to the first three, and state whether non-disclosure agreements were used:

The innovation has been disclosed under NDA to ILM.

Item 5. Identify each SGI project or product which utilizes or may utilize the invention. Also list the current status of each such project, including any known or anticipated MR dates.

Bali and the programmable shading project. Both are due to MR around 2000.

Item 6. Have there been any attempts to demonstrate, market or sell each such product outside of SGI? (Include beta tests.)

No.

Item 7. Identify and describe any prior references which are relevant to the invention (products, patents, publications, etc.). Provide pointers to on-line sources.

There are software papers and reports such as those by Greg Ward, Larson (now at SGI) which detail the efforts to describe extended range framebuffers, but I am sure tha the s10e5 format is new.

Item 8. Briefly describe the invention in the following format. Each section need only be a paragraph or two. Provide pointers to supplemental on-line information, if available.

PROBLEM: State the problem which motivated or required a solution provided by your invention.

Multipass graphics algorithms, especially those implementing shading language programs build values in the framebuffer during computation that will typically go above 1.0 and below 0.0.

## EXHIBIT I

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SOLUTION: Describe how your invention solves the problem.

The s10e5 framebuffer provides a good compromise of range, precision and bandwidth for solving that problem.

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DIFFERENTIATION: Describe how others have tried to solve the same or similar types of problems, and how your invention differs.

There have been software algorithms that use IEEE 32bit floating point framebuffers or shared exponent formats like the one in the Radiance program by Greg Ward, but no hardware vendor has provided a format with the range and flexibility of the s10e5 format.

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STRATEGIC IMPORTANCE: In a sentence or two, state why this invention is strategically valuable to SGI. In other words, explain why SGI would care if one of our competitors patented this technology, or why our competition would care if SGI patented this technology. Note: A patent gives us the right to prevent anyone else from making, using or selling the patented invention.

All future graphics will be done on floating point framebuffers. Even today, there are many image formats derived from sensors capable of acquiring images with extended range that the s10e5 format is capable of handling but no other hardware format available today can handle.

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DRAWING: Please list the on-line address of at least one illustrative drawing, screenshot, schematic, block diagram, or flowchart (rough sketches are OK):

The best solution is to look at the bali online documentation.

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Item 9. Division information

Your Division: Visual Systems

Department Manager Information:

Manager's name: Dan Baum

Manager's Phone: 933-3671 and email: drb@sgi.

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Item 10. Technology Classification

Technology Classification: Graphics

EXHIBIT I

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Jeannette Schreckenghaust  
Intellectual Property Administrator  
Silicon Graphics, Inc.

Tel: (650) 933-3019  
Fax: (650) 932-0652  
jschreck@corp.sgi.com

